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MEMORANDUM

June 25, 2001

TO: Steve Hampton

FROM: Krieg Brown, Josh Levine, and Mark Curry

SUBJECT: Estimate of Human Use Impacts from the *T/V Command* Oil Spill

INTRODUCTION AND SUMMARY

On September 26, 1998, the *T/V Command* (owned and operated by Anax International Agencies) spilled an estimated 60 barrels (2,500 gallons) of bunker fuel oil in the Pacific Ocean outside of San Francisco Bay. From September 30 to October 11, the *Command* oil spill had a measurable adverse impact on beach use over 15 miles of shoreline in San Mateo County. Based on the available data for the impacted area, we estimate that more than 18,228 visitor days were affected by the *Command* oil spill. We estimate the value of these visitor days at $113,386. This estimate consists of $47,108 in lost use and $66,278 in diminished use.

This memorandum summarizes our estimate of human use impacts resulting from the *Command* oil spill. This assessment relies on information that was readily available at the time of our analysis, including beach use data obtained from the California Department of Parks and Recreation and the James Fitzgerald Marine Reserve. In all cases, our assessment methods are consistent with those typically employed in natural resource damage assessment for screening level analysis.

The remainder of this memorandum provides a detailed derivation of our results. We begin with a brief overview of economic valuation concepts for human use impacts followed by a description of the data sources used within our analysis. Following this discussion, we summarize our estimation procedures for baseline visitation.

OVERVIEW OF ECONOMIC VALUE

The *Command* oil spill interrupted the flow of recreational services to individuals participating in beach-related activities (e.g., walking, jogging, swimming, surfing, tidal pool viewing, and picnicking) on the coastline from Montara State Beach to Bean Hollow State Beach. The affects of these service interruptions are measured in two ways:

Lost Use Value. Lost use value measures the economic impacts to individuals who did not participate in recreational activities as a result of the oil spill. Physical site restrictions, the perception of access restrictions, or diminished environmental quality can result in lost use. We calculate each individual's lost use as their full value of recreational utility (i.e., consumer's surplus) on a per person per day basis. We calculate total lost use as the sum of each individual's consumer surplus across all lost trips.

Diminished Use Value. Individuals experience diminished satisfaction when an oil spill reduces the quality of a given recreational activity, or compels substitution from a preferred activity to a secondary choice. Diminished use value represents the economic loss these individuals experience since they are unable to participate in their recreation activity of choice or because the activity has diminished quality. We calculate this loss as the difference between the value gained from the secondary or diminished activity and the value that would have been gained but for the oil spill.

DATA SOURCES

We relied on two sources of data to quantify beach and other shoreline uses at the impacted areas. These include the following:

California Department of Parks and Recreation, Resource Management (CDPR). Public beach use data were obtained from Victoria Seidman at CDPR. Beach use data were provided for the following California State Beaches: Montara, Half Moon Bay, Cowell Ranch, San Gregorio, Pomponio, Pescadero, and Bean Hollow State Beaches, and Point Montara Lighthouse. Visitor data are recorded on a monthly basis, but the data collection method varies from beach to beach (i.e. everyday or every other day). The state estimates monthly beach use data at each beach using vehicle parking estimates (paid and free parking), non-vehicle visitor counts, group visitor counts, and overnight visitor counts. Vehicle parking estimates are multiplied by a ratio representing the number of visitors per vehicle. The vehicle conversion factor for Pomponio, Pescadero, Bean Hollow, San Gregorio, and the Half Moon Bay State Beaches (Dunes, Venice, and Francis Beaches) is 2.5 visitors per vehicle, and 2.0 visitors per vehicle for Cowell Ranch and Montara State Beaches. At beaches with camping facilities, the conversion factor used to estimate the number of overnight visitors is 3.5 people per group.

James V. Fitzgerald Marine Reserve (Marine Reserve). Visitor data for the Marine Reserve were obtained from Park Ranger Steven J. Durkin. The Marine Reserve records the number of visitors on a daily basis. The reserve is three miles long and located

between the Point Montara Lighthouse to the north and Pillar Point to the south. It is the largest, most accessible intertidal area on the West Coast. Roughly 130,000 people visit the Marine Reserve annually. There are no fees to enter the reserve and it is open from sunrise to sunset.

HUMAN USE IMPACTS RESULTING FROM THE *T/V COMMAND* OIL SPILL

The *Command* oil spill affected shoreline areas extending from Montara State Beach to Bean Hollow State Beach for the period September 30 to October 4. During this period, service disruptions can be attributed to physical oiling and consequent clean up activities. Accordingly, our analysis focuses on federal and state managed beaches and shoreline areas from Montara State Beach to Bean Hollow State Beach, including the James V. Fitzgerald Marine Reserve.

Baseline Visitation

To estimate baseline use during the spill impact period, we calculated mean visitation for each beach for the period September 30 to October 4. For the state beaches, we estimated mean daily visitation by averaging all data available for the period September through October of 1995 to 1999.[1] We then multiplied this estimate (3,322 trips/day) by the number of days affected by the oil spill (i.e., September 30 to October 4). For the Fitzgerald Marine Reserve, we followed a similar process, except rather than using monthly totals, we averaged data only for those days impacted by the spill (i.e., September 30th to October 4th for 1996 to 1999). Since the actual day of the week was known for the Fitzgerald Marine Reserve data, we averaged the daily estimates to establish average visitation on weekdays and weekend days (132 and 612 trips/day, respectively). We then applied these estimates to the three weekdays and two weekend days included in the oil spill impact period. Based on this methodology, we estimate baseline beach visitation of 18,228 individuals over the area affected by the oil spill for the period of September 30 to October 4, 1998. Estimates of baseline visitation for the state beaches and the Marine Reserve are shown in Tables 1 and 2, respectively.

[1] Visitor data for the state beaches was averaged for the years 1995 to 1999, with the exception of Point Montara Lighthouse, which was averaged from 1996 to 1999 because of incomplete data for 1995.

Table 1 Baseline Visitation at State Beaches[1] Impacted by the *T/V Command* Oil Spill								
	Average Daily Visitation							
	1995	1996	1997	1998	1999	Average	Number of Affected Days	Estimated Baseline Visitation
September Visitation	3,590	4,525	4,047	3,564	4,328	4,011	1	-----
October Visitation	2,618	3,020	2,092	2,042	3,391	2,633	4	-----
Mean Visitation September/October	3,104	3,772	3,070	2,803	3,859	3,322	5	**16,608[2]**

Notes:
1 California State Beaches include Montara, Half Moon Bay, Cowell Ranch, San Gregorio, Pomponio, Pescadero, and Bean Hollow State Beaches, and Point Montara Lighthouse.
2. Does not sum due to rounding.

Table 2 Baseline Visitation at Marine Reserve[1] Impacted by the *T/V Command* Oil Spill				
	Average Daily Visitation[2]			
	1996	1997	1998	1999
September 30	100	155	120	125
October 1	170	170	120	90
October 2	130	100	170	650
October 3	130	50	650	700
October 4	220	340	720	130
			Number of Affected Days in 1998[3]	Estimated Baseline Visitation
Average Weekend Day Visitation	612		2	1,224
Average Weekday Visitation	132		3	396
TOTAL				**1,620**

Notes:
1. Marine Reserve refers to James V. Fitzgerald Marine Reserve.
2. Shaded numbers refer to visitation on weekend days.
3. September 30, 1998 - October 4, 1998 = Wednesday - Sunday.

Other small beaches that were impacted by the spill also are interspersed among the length of shoreline defined by Montara State Beach to Bean Hollow State Beach. Those identified by the Shoreline Evaluation Forms, SCAT Team Reports, Unified Command News Releases, and newspaper articles are listed below.

Moss Beach: A small town just south of Point Montara Lighthouse with an open beach.

Seal Cove: A small beach with intertidal areas located near the Fitzgerald Marine Reserve.

Pillar Point: A small boat harbor that contains a municipal fishing pier, boat ramp, dinghy hoist, charter boats, picnic area, and food services.

Pillar Point Beach: Accessible at low-tide, a surfing spot known as "Maverick's."

Tunitas Beach: Public beach surrounded by private property, no parking or facilities are available. Only access is through San Gregorio Private Beach to the south or at low tide from Martin's Beach to the north.

Pebble Beach: Parking, picnic tables, and restrooms.

Although these beaches are active recreation sites, we did not estimate baseline use or oil spill impacts at these locations because visitation data were not available. Since these locations were impacted by the oil spill, our estimate of baseline visitation and lost and diminished use represent a lower bound on the total loss.

Valuation of Beach Use Impacts

We use the benefits transfer method to value human use service interruptions resulting from the *Command* oil spill. This method uses resource valuation estimates presented in existing studies to calculate the approximate value of lost and diminished services associated with affected activities. The values employed in benefits transfer should approximate as closely as possible the characteristics of the impacted site and activity, including site access, population characteristics, and opportunities for substitution. For the purpose of the *Command* oil spill, we relied on the value for general beach recreation from the *American Trader* case.[2] Adjusting this value to June 2000 dollars, we assign a value of $20.19 per person per day of beach recreation.

Lost Use

Based on historic data, we estimate that 18,228 beach trips would have been taken in the absence of the oil spill. However, due to the actual and perceived degradation in the quality of the resource during and following the spill, a portion of these individuals avoided the beach completely. Because no data are available to quantify the number of individuals that did not visit the beach as a result of the oil spill, we estimated the number of lost trips based on our experience evaluating beach visitation impacts resulting from oil spills with similar characteristics to the *Command*. Specifically, we estimate that 10 percent of the potential user population avoided the beach during the oil spill impact period of September 30 to October 4. We also estimate that two percent of the potential user population avoided the beach during the week following the completion of cleanup activities (i.e., October 5th to October 11th). Based on these assumptions, we calculate that 1,823 individuals avoided the beach during the impact period and 510 individuals avoided the beach during the following week. When these 2,333 lost trips are valued at $20.19 per trip, we estimate a lost use value of $47,108.

[2] Ideally, each recreation activity (e.g., swimming, walking, surfing) should be valued individually since each ascribes a different value. However, lack of detailed use data for the impacted beaches precludes analysis across different activities.

Diminished Use

During the oil spill impact period, we estimate that 16,405 beach visits took place.[3] Based on prior work we have performed evaluating oil spill impacts in California coastal waters, we estimate that each of these individuals experienced a 20 percent loss in utility due the oil spill and the associated cleanup activities. Therefore, each individual that visited the beach during the oil spill experienced a utility loss of approximately $4.04. Multiplied across all trips, we estimate a diminished use value of $66,278.

Total Human Use Effects

The total value of the human use impacts resulting from the *Command* oil spill is represented by the sum of lost use and diminished use and is calculated at $113,386.

[3] To calculate the number of diminished use trips we subtracted the number of lost trips (1,823) from the estimated baseline use (18,228).